2.0 ALTERNATIVES

2.1 Background

Representatives from the USACE, USFWS, FWC, ENP, SFWMD, DERM, FDEP, and FDACS evaluated a number of options that had potential as solutions in satisfying the project purpose. These options included changes in operational criteria for existing structures throughout the region that could influence water levels within the various sparrow subpopulations. Two interagency modeling meetings were held to discuss potential options for meeting the criteria stated in the USFWS BO and to evaluate modeling runs produced by the USACE prior to the meetings. Changes in the operation of various structures were proposed during the meetings and in subsequent correspondence, and appropriate model runs were produced. The modeling runs were posted on the USACE Jacksonville District Website (http://www.saj.usace.army.mil) as each was produced. The interagency review team members were informed as the model runs were posted, and comments and suggestions were used to modify the potential alternative plans. The alternative model runs were compared to the 1995 Base conditions, which represents conditions under normal C&SF operations with Test 7, Phase I operations in the ENP/South Dade Conveyance System (SDCS) prior to Emergency deviations and ISOP.

2.2 Description of the Alternatives

Six plans were selected for evaluation in this document. The following sections describe the components of the individual plans, and a summary of operational treatments under each plan is included in Table 2. Table 3 summarizes the differences in operational parameters between the six alternatives.

2.2.1. Alternative 1 (No Action).

The USACE is currently regulating hydrologic releases to the ENP through the ISOP program March 2000 EA. However, USFWS determined that early ISOP operations might not meet the minimum targets of the RPA criteria set forth by USFWS BO for CSSS subpopulations, so slight modifications of the ISOP operating conditions were required to provide a plan that was capable of being implemented. In the March 2000 EA, ISOP4PA was the modeling run defined at the time with the current that additional modeling could be required to better meet the USFWS BO. Subsequent modeling produced the No Action Alternative ISOP 9d (see Table 2), which was designed to meet the RPA targets and was authorized under the current ISOP program. The changes in ISOP 9d with respect to ISOP 4PA were specific improvements in the opening and closing criteria in canal/structures that affected the eastern CSSS subpopulations. In the fall of 2000, modifications to ISOP 9d were made to produce ISOP 9dR (see Table 2). The specific changes are the removal of the temporary deviation to WCA 2A regulation schedule and adjustment to WCA 3A regulation schedule, which allowed for the S-12D structure to be operated all year as needed, while closing some structures as early as November 1, and including the spring 2000 flow rate at S-332B. Changes were also

ISOP 9d
ation schedules for WCA-2A (S-11A,B,C tures closed) WCA 3A as specified by USACE
ed Nov 1 to July 15 independent of WCA 3A s.
A closed Nov 1 to Jul 15; B closed Jan 1 to Jul 15; C close Feb 1 to Jul 15; D operated normally according to WCA 3A dule. ollowed WCA 3A regulation after July 15.
of the rainfall plan target to NESRS, plus as h of the remaining 45% that the S-12s can't harge to be passed through S-334; and subject to city constraints, which are 1350 cfs at S-333, L- aximum stage limit, and canal stage limits nstream of S-334.
lischarge to NESRS; release 55% of the rainfall target, plus as much of the remaining 45% that S-12s can't discharge through S-333 and S-334, ect to capacity constraints.
ft
ulatory releases as per WCA 3A deviation dule.
ulatory releases as per WCA 3A deviation dule.
e as 95Base except that it also may pass all or of S-333 releases to the SDCS, depending on e at G-3273.
ped up to 325 cfs; -On at 4.7, Off at 4.2; -On at 4.7, Off at 4.2.
acres with emergency overflow.
ped up to 500 cfs design capacity from July 16 ov 30; 325 cfs Dec 1 to Jan 31; 165 cfs from 1 to Jul 15. -On at 5.0, Off at 4.8 t-On at 4.5, Off at 4.0

S-332	Operated according to Taylor Slough rainfall plan with 465 cfs capacity, subject to 165 cfs limitations from Mar 1 to Jul 15.	Operated according to Taylor Slough rainfall plan with 465 cfs capacity, subject to 165 cfs limitations from Mar 1 to Jul 15.	Closed
S-175	Dry-Open at 4.7, Close at 4.3 Wet-Open at 4.7, Close at 4.3	Dry-Open at 4.7, Close at 4.3 Wet-Open at 4.7, Close at 4.3	Closed
S-194	Dry-Open at 5.3, Close at 4.8 Wet-Open at 5.3, Close at 4.8	Operated to maximize flood control discharges to coast; Dry-Open at 4.7, Close at 4.2 Wet-Open at 4.7, Close at 4.2.	Operated to maximize flood control discharges to coast; Dry-Open at 4.7, Close at 4.2 Wet-Open at 4.7, Close at 4.2.
S-196	Dry-Open at 5.5, Close at 4.8 Wet-Open at 5.5, Close at 4.8	Operated to maximize flood control discharges to coast; Dry-Open at 4.7, Close at 4.2 Wet-Open at 4.7, Close at 4.2.	Operated to maximize flood control discharges to coast; Dry-Open at 4.7, Close at 4.2 Wet-Open at 4.7, Close at 4.2.
S-176	Dry-Open at 5.0, Close at 4.75 Wet-Open at 5.0, Close at 4.75	Dry-Open at 4.7, Close at 4.5 Wet-Open at 4.7, Close at 4.5.	Dry-Open at 4.7, Close at 4.5 Wet-Open at 4.7, Close at 4.5.
S-18C	Dry-Open at 2.6, Close at 2.3 Wet-Open at 2.6, Close at 2.3	Dry-Open at 2.6, Close at 2.3 Wet-Open at 2.6, Close at 2.3	Dry-Open at 2.25, Close at 2.0 Wet-Open at 2.25, Close at 2.0

Note:

1. 95Base Modified model run best duplicates 95Base (Test 7 Phase I) conditions.
2. ISOP 4PA is the initial ISOP 2000 operations as specified in the following Corps of Engineers documents: December 8, 1999 ISOP, January 5, 1999: Draft ISOP for period January 4 through February 29 and Jan 10, 2000 Draft Environmental Assessment. The model run was simulated in position analysis mode, in which, the SFWMM used observed Lake Okeechobee, canal and marsh stages to estimate the initial conditions throughout the model domain. The model was then run using a representative climatic data set (1965-1995) with re-initialization to the initial conditions on the 1st of January of each year.
3. No changes to operational criteria of 95Base (includes Test 7 Phase I) for structures not listed in the table above.

Table 2. Description of Alternatives.

Treatment	Alternative 1 (No Action)
	ISOP 9dR
Regulation Schedule	Deviation schedule for WCA 3A as specified by USACE including raising Zone D to Zone C from Nov 1 to Feb. 11.
S-343 A/B **S-344**	Closed Nov 1 to July 15 independent of WCA 3A levels.
S-12 A/B/C/D	S-12A closed Nov 1 to Jul 15; S-12B closed Jan 1 to Jul 15; S-12 C close Feb 1 to Jul 15; S-12D operated normally according to WCA 3A schedule. Follow WCA 3A regulation schedule after July 15.
S-333: **G-3273 < 6.8'**	55% of the rainfall plan target to NESRS, plus as much of the remaining 45% that the S-12s can't discharge to be passed through S-334; and subject to capacity constraints, which are 1350 cfs at S-333, L-29 maximum stage limit, and canal stage limits downstream of S-334.
S-333: **G-3273 > 6.8'**	No discharge to NESRS; release 55% of the rainfall plan target, plus as much of the remaining 45% that the S-12s can't discharge through S-333 and S-334, subject to capacity constraints.
L-29 constraint	9.0 ft
S-337	Regulatory releases as per WCA 3A deviation schedule.
S-151	Regulatory releases as per WCA 3A deviation schedule.
S-334	Same as 95Base except that it also may pass all or part of S-333 releases to the SDCS, depending on stage at G-3273.
S-332B	Pumped up to 325 cfs from June - January; 125 cfs from February – May; Dry-On at 4.7, Off at 4.2; Wet-On at 4.7, Off at 4.2.
S-332B Seepage Reservoir	160 acres with emergency overflow.
S-332D	Pumped up to 500 cfs design capacity from July 16 to Nov 30; 325 cfs Dec 1 to Jan 31; 165 cfs from Feb 1 to Jul 15. Dry-On at 5.0, Off at 4.8; Wet-On at 4.5, Off at 4.0.
S-332	Closed
S-175	Closed
S-194 **S-196**	Operated to maximize flood control discharges to coast; Dry-Open at 4.7, Close at 4.2 Wet-Open at 4.7, Close at 4.2.
S-176	Dry-Open at 4.7, Close at 4.5 Wet-Open at 4.7, Close at 4.5.
S-18C	Dry-Open at 2.25, Close at 2.0 Wet-Open at 2.25, Close at 2.0

s (continued).

Alternative 2	
Phase 1	**Phase 2**
IOP 2b	**IOP 2**
CA 2A (S-11 A,B,C structures closed) and	Deviation schedules for WCA 2A (S-11 A,B,C structures closed) and 3A as specified by USACE.
pendent of WCA 3A levels.	Closed Jan 1 to July 15 independent of WCA 3A levels.
; 15; after Jul 15.	S-12A closed Dec 1 to Jul 15; S-12B closed Jan 1 to Jul 15; S-12 C,D close Feb 1 to Jul 15; Follow WCA 3A regulation schedule after Jul 15.
et to NESRS, plus as much of the :s can't discharge to be passed through S- constraints, which are 1350 cfs at S-333, ınd canal stage limits downstream of S-	S-333 open to deliver 55% of Shark Slough target flows as per rainfall plan target (rainfall formula + WCA 3A regulatory discharge).
ease 55% of the rainfall plan target, plus as that the S-12s can't discharge through S- pacity constraints.	Maximum possible discharge subject to S-333 design capacity (1350 cfs) with G3273 trigger removed.
	9.0 ft
VCA 3A deviation schedule	Regulatory releases as per WCA 3A deviation schedule
VCA 3A deviation schedule	Regulatory releases as per WCA 3A deviation schedule
ase to SDCS	Closed
4.7, Off at 4.2	Pumped up to 325 cfs; On at 4.5, Off at 4.0
verflow.	160 acres with emergency overflow.
ı capacity from Jul 16 to Nov 30; 325 cfs fs from Jan 1 to Jul 15.	Pumped up to 500 cfs design capacity from Jul 16 to Nov 30; 325 cfs from Dec 1 to Jan 31; 165 cfs from Feb 1 to Jul 15. Dry-On at 5.0, Off at 4.8; Wet-On at 4.5, Off at 4.0.
	Closed
	Closed
control discharges to coast; 2; 2.	Operated to maximize flood control discharges to coast; Dry- Open at 4.7, Close at 4.2; Wet- Open at 4.7, Close at 4.2.
5; 5.	Dry-Open at 5.0, Close at 4.75; Wet-Open at 5.0, Close at 4.75.
.0; :.0.	Dry-Open at 2.25, Close at 2.0; Wet-Open at 2.25, Close at 2.0.

ternatives (continued).

Alternative 3	
Phase 1	**Phase 2**
IOP 2a	**IOP 2**
dules for WCA 2A (S-11 A,B,C structures closed) and 3A USACE.	Deviation schedules for WCA 2A (S-11 A,B,C structures closed) and 3A as specified by USACE.
) July 15 independent of WCA 3A levels.	Closed Jan 1 to July 15 independent of WCA 3A levels..
Dec 1 to Jul 15; Jan 1 to Jul 15; Feb 1 to Jul 15; 3A regulation schedule after Jul 15.	S-12A closed Dec 1 - Jul 15; S-12B closed Jan 1 - Jul 15; S-12 C,D closed Feb 1 - Jul 15; Follow WCA 3A regulation schedule after Jul 15.
deliver 55% of Shark Slough target flows as per rainfall plan formula + WCA 3A regulatory discharge).	S-333 open to deliver 55% of Shark Slough target flows as per rainfall plan target (rainfall formula + WCA 3A regulatory discharge).
	Maximum possible discharge subject to S-333 design capacity (1350 cfs) with G3273 trigger removed.
	9.0 ft
eases as per WCA 3A deviation schedule	Regulatory releases as per WCA 3A deviation schedule
eases as per WCA 3A deviation schedule	Regulatory releases as per WCA 3A deviation schedule
	Closed
325 cfs; On at 4.5, Off at 4.0.	Pumped up to 325 cfs; On at 4.5, Off at 4.0.
emergency overflow.	160 acres with emergency overflow.
500 cfs design capacity from Jul 16 to Nov 30; 325 cfs from 1; 165 cfs from Feb 1 to Jul 15. , Off at 4.8; , Off at 4.0.	Pumped up to 500 cfs design capacity from Jul 16 to Nov 30; 325 cfs from Dec 1 to Jan 31; 165 cfs from Feb 1 to Jul 15. Dry-On at 5.0, Off at 4.8; Wet-On at 4.5, Off at 4.0.
	Closed
	Closed
aximize flood control discharges to coast; 4.7, Close at 4.2; 4.7, Close at 4.2.	Operated to maximize flood control discharges to coast; Dry- Open at 4.7, Close at 4.2; Wet-Open at 4.7, Close at 4.2.
5.0, Close at 4.75; 5.0, Close at 4.75.	Dry-Open at 5.0, Close at 4.75; Wet-Open at 5.0, Close at 4.75.
2.25, Close at 2.0; 2.25, Close at 2.20.	Dry-Open at 2.25, Close at 2.0; Wet-Open at 2.25, Close at 2.20.

Table 2. Description of Alternatives (continued).

	Alternative 4	
Treatment	**Phase 1**	**Phase 2**
	IOP 3a	**IOP 3**
Regulation Schedule	Deviation schedules for WCA 1, 2A and 3A as specified by USACE.	Deviation schedules for WCA 1, 2A and 3A as specified by USACE.
S-343 A/B S-344	Closed Nov 1 to July 15 independent of WCA 3A levels.	Closed Nov 1 to July 15 independent of WCA 3A levels..
S-12 A/B/C/D	S-12A, B, C and D closed Nov 1 to Jul 15; Follow WCA 3A regulation schedule after Jul 15.	S-12A, B, C and D closed Nov 1 to Jul 15; Follow WCA 3A regulation schedule after Jul 15.
S-333: G-3273 < 6.8'	S-333 open to deliver 55% of Shark Slough target flows as per rainfall plan target (rainfall formula + WCA 3A regulatory discharge).	S-333 open to deliver 55% of Shark Slough target flows as per rainfall plan target (rainfall formula + WCA 3A regulatory discharge).
S-333: G-3273 > 6.8'	S-333 closed	Maximum possible discharge subject to S-333 design capacity (1350 cfs) with G3273 trigger removed.
L-29 constraint	9.0 ft	9.0 ft
S-337	Regulatory releases as per WCA 3A deviation schedule	Regulatory releases as per WCA 3A deviation schedule
S-151	Regulatory releases as per WCA 3A deviation schedule	Regulatory releases as per WCA 3A deviation schedule
S-334	Closed	Closed
S-332B	Pumped up to 325 cfs; Dry-On at 4.5, Off at 4.0; Wet-On at 4.5, Off at 4.0.	Pumped up to 325 cfs; Dry-On at 4.5, Off at 4.0; Wet-On at 4.5, Off at 4.0.
S-332B Seepage Reservoir	160 acres with emergency overflow.	160 acres with emergency overflow.
S-332D	Pumped up to 500 cfs design capacity from Jul 16 to Nov 30; 325 cfs from Dec 1 to Jan 31 31; 165 cfs from Feb 1 to Jul 15. Dry-On at 5.0, Off at 4.8; Wet-On at 4.5, Off at 4.0.	Pumped up to 500 cfs design capacity from Jul 16 to Nov 30; 325 cfs from Dec 1 to Jan 31; 165 cfs from Feb 1 to Jul 15. Dry-On at 5.0, Off at 4.8; Wet-On at 4.5, Off at 4.0.
S-332	Closed	Closed
S-175	Closed	Closed
S-194 S-196	Operated to maximize flood control discharges to coast; Dry-Open at 4.7, Close at 4.2; Wet-Open at 4.7, Close at 4.2.	Operated to maximize flood control discharges to coast; Dry-Open at 4.7, Close at 4.2; Wet-Open at 4.7, Close at 4.2.
S-176	Dry-Open at 5.0, Close at 4.75; Wet-Open at 5.0, Close at 4.75.	Dry-Open at 5.0, Close at 4.75; Wet-Open at 5.0, Close at 4.75.
S-18C	Dry-Open at 2.25, Close at 2.0; Wet-Open at 2.25, Close at 2.0.	Dry-Open at 2.25, Close at 2.0; Wet-Open at 2.25, Close at 2.0.

Table 2. Description of Alternatives (continued).

	Alternative 5 (Preferred Alternative)	
Treatment	**Phase 1**	**Phase 2**
	IOP 4a (ISOP 9dR1)	**IOP 4 (ISOP 9dR2)**
Regulation Schedule	No deviation schedules for WCA 2A. Deviation schedule for WCA 3A as specified by USACE including raising Zone D to Zone C from Nov 1 to Feb. 11.	No deviation schedules for WCA 2A. Deviation schedule for WCA 3A as specified by USACE including raising Zone D to Zone C from Nov 1 to Feb. 11.
S-343 A/B S-344	Closed Nov 1 to July 15 independent of WCA 3A levels..	Closed Nov 1 to July 15 independent of WCA 3A levels..
S-12 A/B/C/D	S-12A closed Nov 1 to Jul 15; S-12B closed Jan 1 to Jul 15; S-12 C,D close Feb 1 to Jul 15; Follow WCA 3A regulation schedule after Jul 15.	S-12A closed Nov 1 to Jul 15; S-12B closed Jan 1 to Jul 15; S-12 C,D close Feb 1 to Jul 15; Follow WCA 3A regulation schedule after Jul 15.
S-333: G-3273 < 6.8'	55% of the rainfall plan target to NESRS, plus as much of the remaining 45% that the S-12s can't discharge to be passed through S-334; and subject to capacity constraints, which are 1350 cfs at S-333, L-29 maximum stage limit, and canal stage limits downstream of S-334.	55% of the rainfall plan target to NESRS, plus as much of the remaining 45% that the S-12s can't discharge to be passed through S-334; and subject to capacity constraints, which are 1350 cfs at S-333, L-29 maximum stage limit, and canal stage limits downstream of S-334.
S-333: G-3273 > 6.8'	No discharge to NESRS; release 55% of the rainfall plan target, plus as much of the remaining 45% that the S-12s can't discharge through S-333 and S-334, subject to capacity constraints.	Maximum possible discharge subject to S-333 design capacity (1350 cfs) with G3273 trigger removed.
L-29 constraint	9.0 ft	9.0 ft
S-337	Regulatory releases as per WCA 3A deviation schedule	Regulatory releases as per WCA 3A deviation schedule
S-151	Regulatory releases as per WCA 3A deviation schedule	Regulatory releases as per WCA 3A deviation schedule
S-334	Same as 95Base except that it also may pass all or part of S-333 releases to the SDCS, depending on stage at G-3273.	Closed
S-332B	Pumped up to 500 cfs from Aug-Jan; 325 cfs in Feb, Jun, and July; and 125 cfs Mar-May; Dry-On at 5.0, Off at 4.3; Wet-On at 4.7, Off at 4.0.	Pumped up to 500 cfs from Aug-Jan; 325 cfs in Feb, Jun, and July; and 125 cfs Mar-May; Dry-On at 5.0, Off at 4.3; Wet-On at 4.7, Off at 4.0.
S-332B Seepage Reservoir	160 acres with emergency overflow.	160 acres with emergency overflow.
S-332D	Pumped up to 500 cfs design capacity from July 16 to Nov 30; 325 cfs Dec 1 to Jan 31; 165 cfs from Feb 1 to Jul 15. Dry-On at 5.0, Off at 4.8; Wet-On at 4.7, Off at 4.2.	Pumped up to 500 cfs design capacity from July 16 to Nov 30; 325 cfs Dec 1 to Jan 31; 165 cfs from Feb 1 to Jul 15. Dry-On at 5.0, Off at 4.8; Wet-On at 4.7, Off at 4.2.
S-332	Closed	Closed
S-175	Closed	Closed
S-194 S-196	Operated to maximize flood control discharges to coast; Dry-Open at 4.7, Close at 4.2; Wet-Open at 4.7, Close at 4.2.	Operated to maximize flood control discharges to coast; Dry-Open at 4.7, Close at 4.2; Wet-Open at 4.7, Close at 4.2.
S-176	Dry-Open at 4.85, Close at 4.65; Wet-Open at 4.8, Close at 4.7.	Dry-Open at 4.85, Close at 4.65; Wet-Open at 4.8, Close at 4.7.
S-18C	Dry-Open at 2.25, Close at 2.0; Wet-Open at 2.25, Close at 2.0.	Dry-Open at 2.25, Close at 2.0; Wet-Open at 2.25, Close at 2.0.

Phase 2
IOP 5 (ISOP 9db??)
ation schedules for WCA 2A. Deviation schedule for WCA 3A as d by USACE including raising Zone D to Zone C Nov 1 to Feb. 11.
Nov 1 to July 15 independent of WCA 3A levels..
losed Nov 1 to Jul 15; losed Jan 1 to Jul 15; D close Feb 1 to Jul 15; WCA 3A regulation schedule after Jul 15.
the rainfall plan target to NESRS, plus as much of the remaining 45% S-12s can't discharge to be passed through S-334; and subject to constraints, which are 1350 cfs at S-333, L-29 maximum stage limit, al stage limits downstream of S-334.
im possible discharge subject to S-333 design capacity (1350 cfs) 273 trigger removed.
ory releases as per WCA 3A deviation schedule
ory releases as per WCA 3A deviation schedule
up to 500 cfs from June-February; 325 cfs in Mar and May; 125 cfs
at 5.0, Off at 4.3; at 4.75, Off at 4.2.
s with overflow.
up to 500 cfs design capacity from July 16 to Nov 30; 325 cfs Dec 1 ; 165 cfs from Feb 1 to Jul 15. at 5.0, Off at 4.8; at 4.7, Off at 4.2.
to maximize flood control discharges to coast; n at 4.7, Close at 4.2; en at 4.7, Close at 4.2.
n at 4.85, Close at 4.65; en at 4.8, Close at 4.7.
n at 2.25, Close at 2.0; en at 2.25, Close at 2.0.

Table 3. Comparison of Alternatives Features.

Treatment	Comparison of Alternatives
Regulation Schedule	Alternative 1 – Deviation schedule for WCA 3A (Zone D to Zone C) Alternative 2 – Deviation schedule for WCA 2A and 3A Alternative 3 – Deviation schedule for WCA 2A and 3A Alternative 4 – Deviation schedule for WCA 1, 2A, and 3A Alternative 5 – Deviation schedule for WCA 3A (Zone D to Zone C) Alternative 6 – Deviation schedule for WCA 3A (Zone D to Zone C)
S-343 A/B; S-344	Alternative 1 – Structures closed November 1 to July 15 Alternative 2 – Structures closed January 1 to July 15 Alternative 3 – Structures closed January 1 to July 15 Alternative 4 – Structures closed November 1 to July 15 Alternative 5 – Structures closed November 1 to July 15 Alternative 6 – Structures closed November 1 to July 15
S-12 A	Alternative 1 – Structure closed November 1 to July 15 Alternative 2 – Structure closed December 1 to July 15 Alternative 3 – Structure closed December 1 to July 15 Alternative 4 – Structure closed December 1 to July 15 Alternative 5 – Structure closed November 1 to July 15 Alternative 6 – Structure closed November 1 to July 15
S-12 B	Alternative 1 – Structure closed January 1 to July 15 Alternative 2 – Structure closed January 1 to July 15 Alternative 3 – Structure closed January 1 to July 15 Alternative 4 – Structure closed November 1 to July 15 Alternative 5 – Structure closed January 1 to July 15 Alternative 6 – Structure closed January 1 to July 15
S-12 C	Alternative 1 – Structure closed February 1 to July 15 Alternative 2 – Structure closed February 1 to July 15 Alternative 3 – Structure closed February 1 to July 15 Alternative 4 – Structure closed November 1 to July 15 Alternative 5 – Structure closed February 1 to July 15 Alternative 6 – Structure closed February 1 to July 15
S-12 D	Alternative 1 – Operated normally according to WCA 3A schedule Alternative 2 – Structure closed February 1 to July 15 Alternative 3 – Structure closed February 1 to July 15 Alternative 4 – Structure closed November 1 to July 15 Alternative 5 – Operated normally according to WCA 3A schedule Alternative 6 – Operated normally according to WCA 3A schedule
S-333; G-3273 <6.8'	Alternative 1 – 55% of the rainfall plan target to NESRS\some through S-334 Alternative 2 – Phase 1 – Discharge limited to outflow through S-334; Phase 2 – S-333 to deliver 55% of SRS target (rainfall + WCA 3A reg. discharge) Alternative 3 – Phase 1&2 – S-333 to deliver 55% of SRS target (rainfall + WCA 3A reg. discharge) Alternative 4 - Phase 1&2 – S-333 to deliver 55% of SRS target (rainfall + WCA 3A reg. discharge) Alternative 5 - Phase 1&2 – 55% of the rainfall plan target to NESRS\some through S-334 Alternative 6 - Phase 1&2 – 55% of the rainfall plan target to NESRS\ some through S-334
S-333; G-3273 >6.8'	Alternative 1 – No discharge to NESRS; Release 55% of the rainfall plan target plus as much of the remainder as possible through S-333 and S-334 Alternative 2 – Phase 1 - Discharge limited to 1350 cfs and limited to outflow through S-344 Phase 2 - Discharge limited to 1350 cfs with G-3273 trigger removed Alternative 3 – Phase 1 – S-333 closed Phase 2 - Discharge limited to 1350 cfs with G-3273 trigger removed Alternative 4 - Phase 1 – S-333 closed Phase 2 - Discharge limited to 1350 cfs with G-3273 trigger removed Alternative 5 – Phase 1 – No discharge to NESRS; Release 55% of the rainfall plan target plus as much of the remainder as possible through S-333 and S-334 Phase 2 – Discharge limited to 1350 cfs with G-3273 trigger removed Alternative 6 – Phase 1 – No discharge to NESRS; Release 55% of the rainfall plan target plus as much of the remainder as possible through S-333 and S-334 Phase 2 – Discharge limited to 1350 cfs with G-3273 trigger removed
L-29 constraint	**Identical for all Alternatives**

S-337	**Identical for all Alternatives**
S-151	**Identical for all Alternatives**
S-334	Alternative 1 – Closed, but may pass S-333 regulatory release to SDCS Alternative 2 – Phase 1 – Closed, but may pass S-333 regulatory release to SDCS Phase 2 – Closed Alternative 3 – Phase 1 & 2 – Closed Alternative 4 – Phase 1 & 2 – Closed Alternative 5 – Phase 1 – Closed, but may pass S-333 regulatory release to SDCS Phase 2 – Closed Alternative 6 – Phase 1 – Closed, but may pass S-333 regulatory release to SDCS Phase 2 – Closed
S-332B	Alternative 1 – Pumped up to 325 cfs June-Jan; 125 cfs Feb-May; On - 4.7; Off - 4.2 (Dry, Wet) Alternative 2 – Phase 1 – Pumped up to 375 cfs; On - 4.5, Off - 4.0 (Dry, Wet) Phase 2 – Pumped up to 325 cfs; On - 4.5, Off - 4.0 (Dry, Wet) Alternative 3 – Phase 1 – Pumped up to 325 cfs; On - 4.5, Off - 4.0 (Dry, Wet) Phase 2 – Pumped up to 325 cfs; On - 4.5, Off - 4.0 (Dry, Wet) Alternative 4 – Phase 1 – Pumped up to 325 cfs; On - 4.5, Off - 4.0 (Dry, Wet) Phase 2 – Pumped up to 325 cfs; On - 4.5, Off - 4.0 (Dry, Wet) Alternative 5 – Phase 1 – Pumped up to 500 cfs Aug-Jan; 325 cfs in Feb, June, July; 125 cfs Mar-May; On - 5.0, Off – 4.3 (Dry); On – 4.7, Off – 4.0 (Wet) Phase 2 – Pumped up to 500 cfs Aug-Jan; 325 cfs in Feb, June, July; 125 cfs Mar-May; On - 5.0, Off – 4.3 (Dry); On – 4.7, Off – 4.0 (Wet) Alternative 6 – Phase 1 – Pumped up to 500 cfs June - Feb; 325 cfs in Mar and May; 125 cfs in Apr; On - 5.0, Off – 4.3 (Dry); On – 4.75, Off – 4.2 (Wet) Phase 2 – Pumped up to 500 cfs June -Feb; 325 cfs in Mar and May; 125 cfs in Apr; On - 5.0, Off – 4.3 (Dry); On – 4.75, Off – 4.2 (Wet)
S-332B Seepage Reservoir	Alternative 1 – 160 acres with emergency overflow Alternative 2 – 160 acres with emergency overflow Alternative 3 – 160 acres with emergency overflow Alternative 4 – 160 acres with emergency overflow Alternative 5 – 160 acres with emergency overflow Alternative 6 – 400 acres with overflow
S-332D	Alternative 1 – Pumped to 500 cfs Jul 16-Nov30; 325 cfs Dec 1-Jan 31; 165 cfs Feb 1-July 15; On – 5.0, Off - 4.8 (Dry); On – 4.5, Off 4.0 (Wet) Alternative 3 – Pumped to 500 cfs Aug-Nov 30; ; 325 cfs Dec 1-Jan 31; 165 cfs Feb 1-July 31; On – 5.0, Off - 4.8 (Dry); On – 4.5, Off 4.0 (Wet) Alternative 3 – Pumped to 500 cfs Aug-Nov 30; ; 325 cfs Dec 1-Jan 31; 165 cfs Feb 1-July 31; On – 5.0, Off - 4.8 (Dry); On – 4.5, Off 4.0 (Wet) Alternative 4 – Pumped to 500 cfs Aug-Nov 30; ; 325 cfs Dec 1-Jan 31; 165 cfs Feb 1-July 31; On – 5.0, Off - 4.8 (Dry); On – 4.5, Off 4.0 (Wet) Alternative 5 – Pumped to 500 cfs Aug-Jan 31; 165 cfs Feb 1-July 31; On – 5.0, Off - 4.8 (Dry); On – 4.5, Off 4.0 (Wet) Alternative 6 – Pumped to 500 cfs July 16 – Nov 30; 325 cfs Dec 1-Jan 31; 165 cfs Feb 1 – July 15; On – 5.0, Off - 4.8 (Dry); On – 4.7, Off 4.2 (Wet)
S-332	**Identical for all Alternatives**
S-175	**Identical for all Alternatives**
S-194; S-196	**Identical for all Alternatives**
S-176	Alternative 1 – Open at 4.7, close at 4.5 (Dry, Wet) Alternative 2 – Phase 1 – Open at 4.7, close at 4.5 (Dry, Wet) Phase 2 – Open at 5.0, close at 4.75 (Dry, Wet) Alternative 3 – Phase 1 – Open at 5.0, close at 4.75 (Dry, Wet) Phase 2 – Open at 5.0, close at 4.75 (Dry, Wet) Alternative 4 – Phase 1 – Open at 5.0, close at 4.75 (Dry, Wet) Phase 2 – Open at 5.0, close at 4.75 (Dry, Wet) Alternative 5 – Phase 1 – Open at 4.85, close at 4.65 (Dry); Open at 4.8, close at 4.7 (Wet) Phase 2 – Open at 4.85, close at 4.65 (Dry); Open at 4.8, close at 4.7 (Wet) Alternative 6 – Phase 1 – Open at 4.85, close at 4.65 (Dry); Open at 4.8, close at 4.7 (Wet) Phase 2 – Open at 4.85, close at 4.65 (Dry); Open at 4.8, close at 4.7 (Wet)
S-18C	**Identical for all Alternatives**

To evaluate the hydrologic equivalence of the USFWS BO, several possible scenarios were modeled using SFWMM. These model runs were termed RPAxxxx, where xxxx was replaced by a number or alphanumeric to distinguish one run from another. RPA 102 represented one reasonable translation of the BO recommendations for the year 2002 (or beyond) and therefore, best represents the expected hydrology for the eastern sparrow subpopulations C, E, and F. Because no specific targets were provided for the C, E, and F subpopulations, RPA 102 was used as a guideline for which alternative hydroperiods had to be "equal to or greater than". Since Alternatives 1, 2, 3, and 4 were developed to meet the hydrologic targets in 2002, it was not necessary to develop a different set of alternatives for 2000 and 2001 where lesser requirements were given.

2.2.2. Alternative 2

Alternative 2 was developed to further improve conditions in the eastern sparrow populations over those under the No Action alternative, while also improving environmental conditions within other affected regions of the project area. It was decided that IOP alternatives must be formulated in two phases; Phase 1 would be in effect prior to the completion of the 8.5 SMA Project; and Phase 2 would take effect once the plan for the 8.5 SMA was completed. For the modeling of the IOP, it was assumed that as a result of the implementation of the 8.5 SMA solution, the G-3273 trigger was no longer in effect.

Phase 1 of Alternative 2 (IOP 2b) differs from the No Action Alternative (ISOP 9dR) in the following ways. IOP 2b includes a deviation to the WCA 2A regulation schedule; the S-343 A/B and S-344 structures would close two months later on January 1; S-12A would close one month later on December 1; S-12D would close from February 1 to July 15; the schedule for S-333 would vary; and pumping schedules for S-332B and S-332D.

Phase 2 of Alternative 2 (IOP 2) differs from the No Action Alternative (ISOP 9dR) by: allowing S-333 to deliver water to NESRS via L-29 at a rate up to its structural capacity when the G-3273 gage is higher than 6.8 feet; close the S-334 structure during regulatory releases from S-333; and incorporate the same changes as Phase 1 (IOP 2b) at S-332B and S-176.

2.2.3. Alternative 3

Alternative 3 also has two phases for the same purpose as Alternative 2, with Phase 1 being implemented prior to the 8.5 SMA Project completion and Phase 2 be implemented after completion of 8.5 SMA Project.

Phase 1 of Alternative 3 (IOP 2a) is similar to Phase 2 of Alternative 2 (IOP 2) with one exception; S-333 would be closed when the G-3273 gage is higher than 6.8 feet. Phase 2 of Alternative 3 (IOP 2) is the same as Phase 2 for Alternative 2.

2.2.4. Alternative 4

Alternative 4 (IOP 3 and IOP 3a) is also implemented in two phases and is similar to Alternative 2 (IOP 2 and IOP 2a) with the exception that the S-12 structures A, B, C, and D and the S-343/S-344 structures would be closed earlier in the year, from November 1 through July 15. IOP 3a would be implemented as Phase 1 and IOP 3 would be implemented as Phase 2.

2.2.5. Alternative 5 (Preferred Alternative)

Alternative 5 (IOP 4a and IOP 4) is the preferred alternative for the proposed project. This alternative resembles the No Action Alternative (ISOP 9dR) to a greater degree than do either Alternative 2 or Alternative 3 since this alternative was developed after ISOP 9dR was produced. Alternative 5 (Phase 1) and the No Action alternative differ only regarding the S-332B pumping schedule and the S-176 schedule. Phase 2 also includes the removal of the G-3273 trigger.

2.2.6. Alternative 6

Phase 1 and Phase 2 of Alternative 6 (IOP 5a and IOP 5b) are identical to Phase 1 and Phase 2 of Alternative 5 with one exception: for Alternative 6, the S-332B seepage reservoir area would be expanded to include an additional 240 acre (approximately) retention area to work in tandem with the existing 160 acre retention area.

2.3 Alternatives Eliminated from Detailed Evaluation

A number of additional alternatives were evaluated that could meet the RPA criteria of the USFWS BO and reduce other adverse impacts to natural resources and the human environment in the project area. As is evident by the number of structures available for operational modification, the number of potential combinations is enormous. However, modification of many of these structures provided negligible benefits, and in some cases, produced adverse effects without meeting the RPA recommendations any better than the alternatives being evaluated in this document. As each of the changes in structure operations was assessed, model runs were produced and posted on the USACE website for evaluation by the interagency team or for informational purposes.

The USFWS RPA required that the Corps implement the exact provisions of Test 7 Phase II or the hydrologic equivalent. Test 7 Phase II required higher canal levels in L-31N than Test 7 Phase I. Recent modeling indicated that private property would be adversely impacted by Test 7 Phase II (Table H-71) on areas within south Dade. For example, the maximum stage reached in cell R17C27, located to the east of L-31N, would have been about 0.48 feet higher under Test 7 Phase II (RPA 102) than under Test 7 Phase I (95BaseMod conditions). The USFWS RPA further constrained the implementation of Test 7 Phase II by limiting the operation of pump station S-332D to a maximum of 165 cfs during the CSSS nesting season

rather than the full capacity of 500 cfs required by Test 7 Phase II. From the actual hydrologic data, referenced in Appendix I, page 136 and Table 24, page 142, there is an indication that potential for flood impacts increased from east to west, with wells located